

## CLAIMS

### WHAT IS CLAIMED IS:

1. An apparatus for performing color conversion with reference to  
5 a profile defining correspondence between colorimetric value data and ink  
amount data, comprising:

a profile memory for storing a plurality of profiles, each profile  
being produced using plural sample ink amount data selected based on an  
evaluation index including a color difference index and an image quality  
10 index, the color difference index representing a color difference between a  
sample color which is calculated from spectral reflectance of a virtual sample  
patch to be printed with ink amounts represented by the sample ink amount  
data and a comparative color which is selected as a basis for comparison, the  
image quality index representing image quality of the virtual sample patch,  
15 the evaluation index for the plurality of profiles being defined to have  
different functional forms;

a color converter for selecting one of the plurality of profiles and for  
converting given colorimetric data into ink amount data with reference to the  
selected profile.  
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2. An apparatus according to claim 1, wherein the color difference  
index includes plural types of available color difference indices, and the  
image quality index includes plural types of available image quality indices,  
and

25 the color converter receives user selection of the color difference  
index and the image quality index, and selects the profile produced using the  
evaluation index including the selected color difference index and the selected  
image quality index.

3. An apparatus according to claim 1, wherein each of the color difference index and the image quality index has plural available types that are associated with a plurality of printing conditions, and

the color converter receives selection of one of the printing  
5 conditions, and selects the profile produced using the evaluation index including proper types of the color difference index and the image quality index associated with the selected printing condition.

4. An apparatus according to claim 1, wherein the plurality of  
10 profiles are associated with plural types of images to be reproduced by the ink amount data, and

the color converter receives selection of one of the plural types of images, and selects the profile associated with the selected image type.

15 5. An apparatus for converting colorimetric value data into ink amount data, comprising:

a first converter for receiving colorimetric value data and outputting ink amount data such that two colorimetric values of a virtual sample patch to be printed with the same ink amounts represented by the ink  
20 amount data under two different viewing conditions are substantially equal to each other;

a second converter for receiving colorimetric value data and outputting ink amount data such that the ink amounts represented by the ink amount data substantially reproduces spectral reflectance associated  
25 with the received colorimetric value;

a selector for selecting one of the first and second converters; and  
an image processor for converting given colorimetric value data into ink amount data using the selected converter.

6. A method for performing color conversion with reference to a profile defining correspondence between colorimetric value data and ink amount data, comprising:

5 (a) providing a plurality of profiles, each profile being produced using plural sample ink amount data selected based on an evaluation index including a color difference index and an image quality index, the color difference index representing a color difference between a sample color which is calculated from spectral reflectance of a virtual sample patch to be printed with ink amounts represented by the sample ink amount data and a  
10 comparative color which is selected as a basis for comparison, the image quality index representing image quality of the virtual sample patch, the evaluation index for the plurality of profiles being defined to have different functional forms;

(b) selecting one of the plurality of profiles; and

15 (c) converting given colorimetric data into ink amount data with reference to the selected profile.

7. A method according to claim 6, wherein the color difference index includes plural types of available color difference indices, and the  
20 image quality index includes plural types of available image quality indices, and

the step (b) includes the steps of receiving user selection of the color difference index and the image quality index, and selecting the profile produced using the evaluation index including the selected color difference  
25 index and the selected image quality index.

8. A method according to claim 6, wherein each of the color difference index and the image quality index has plural available types that are associated with a plurality of printing conditions, and

the step (b) includes the steps of receiving selection of one of the printing conditions, and selecting the profile produced using the evaluation index including proper types of the color difference index and the image quality index associated with the selected printing condition.

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9. A method according to claim 6, wherein the plurality of profiles are associated with plural types of images to be reproduced by the ink amount data, and

the step (b) includes the steps of receiving selection of one of the plural types of images, and selecting the profile associated with the selected image type.

10. A method for converting colorimetric value data into ink amount data, comprising:

(a) providing a first converter for receiving colorimetric value data and outputting ink amount data such that two colorimetric values of a virtual sample patch to be printed with the same ink amounts represented by the ink amount data under two different viewing conditions are substantially equal to each other;

(b) providing a second converter for receiving colorimetric value data and outputting ink amount data such that the ink amounts represented by the ink amount data substantially reproduces spectral reflectance associated with the received colorimetric value;

(c) selecting one of the first and second converters; and

(d) converting given colorimetric value data into ink amount data using the selected converter.

11. A method of producing a profile defining correspondence between colorimetric value data and ink amount data representing a set of ink amounts of plural inks usable by a printer, comprising:

(a) providing a spectral printing model converter configured to convert ink amount data to spectral reflectance of a color patch to be printed according to the ink amount data;

(b) providing a plurality of sample ink amount data each  
5 representing a set of ink amounts of plural inks;

(c) converting each sample ink amount data into spectral reflectance of a virtual sample patch to be printed with the ink amounts represented by the sample ink amount data using the spectral printing model converter;

10 (d) selecting one of a plurality of color difference indices and one or more of a plurality of image quality indices, each color difference index representing a color difference between a sample color which is calculated from the spectral reflectance and a comparative color which is selected as a basis for comparison, each image quality index representing image quality of  
15 the virtual sample patch to be printed according to the sample ink amount data;

(e) calculating values of the selected color difference index and the selected image quality index for the plurality of sample ink amount data;

(f) calculating an evaluation index using the values of the selected  
20 color difference index and the selected image quality index for the plurality of sample ink amount data;

(g) selecting plural sample ink amount data based on the evaluation index; and

(h) producing a profile defining correspondence between  
25 colorimetric value data and ink amount data based on the selected plural sample ink amount data.

12. An apparatus for producing a profile defining correspondence between colorimetric value data and ink amount data representing a set of  
30 ink amounts of plural inks usable by a printer, comprising:

a spectral printing model converter for converting ink amount data to spectral reflectance of a color patch to be printed according to the ink amount data, the spectral printing model converter converting each of a plurality of sample ink amount data into spectral reflectance of a virtual sample patch to be printed with the ink amounts represented by the sample ink amount data;

a selector for selecting one of a plurality of color difference indices and one or more of a plurality of image quality indices, each color difference index representing a color difference between a sample color which is calculated from the spectral reflectance and a comparative color which is selected as a basis for comparison, each image quality index representing image quality of the virtual sample patch to be printed according to the sample ink amount data;

a calculator for calculating values of the selected color difference index and the selected image quality index for the plurality of sample ink amount data;

a calculator for calculating an evaluation index using the values of the selected color difference index and the selected image quality index for the plurality of sample ink amount data;

a selector for selecting plural sample ink amount data based on the evaluation index; and

a profile generator producing a profile defining correspondence between colorimetric value data and ink amount data based on the selected plural sample ink amount data.